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ABSTRACT

A brief review is made of informational books dealing with simple concepts and terminolcgy related to computers. Recommendations are made as to those which are better for children and high school students. A bibliography lists all books considered. (DAG)

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The Illinois Series on Educational Applications of Computers

Computer Literacy

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COMPUTER LITERACY

In the bank, consumer market and taxing process of today we run into the computer, even if we would like to avoid it. So the time has come to talk of computer literacy for people of all ages. To be literate is one thing to the expert and another to the novice. For the purposes of our discussion, we are looking at the subject at the entry level of the novice. Basic knowledge of simple concepts and terminology which give feeling of understanding to the novice, when confronted with an "expert" explanation, are the goals at this level.

Computer literacy at this entry level is needed to allow the computer to function efficiently and prevent the computer from becoming an excuse for malpractice by the businesses using it. Computer literacy is also needed at this level for children. We know that children learn much from the early introduction they receive, via non-fiction and fiction, to various subject areas. A sense of familiarity with a subject gives the child confidence in pursuing it, and the feeling that this is an area in which he "belongs." Therefore, computer literacy should begin before the first course offered in the school system. The concern which is needed with regard to computer literacy before high school is based on this premise that children learn a great deal from their early introduction to subjects via reading both fiction and non-fiction.

Arbuthnot and Sutherland mention the need to satisfy a child's curiosity as one of the major factors in children's reading selections. Another is the need to feel that sense of familiarity which gives the child confidence in an area of pursuit, or the need to belong (p. 6-15).

In order to find what materials about computers would satisfy these needs of children and are well written several steps were taken. The first was to undertake a survey of the printed sources available in the Champaign-Urbana area. In the process of the survey a considerable number of materials were found, but many of them were unavailable for preview. I have included these citations in the comprehensive bibliography for those who may be interested in them. Due to the pressure on publishers to satisfy a current market and the consequent need to produce "instant" authors in the field, these are of varing degrees of quality.

As part of the survey I looked at the lists of informational books available in current sources listing children's books meeting some qualitative criteria. I found none of the books on computers having these qualities. I attributed this to the currency of the field and not to the fact that all of them might have been poor in quality.

To identify titles, I started with the listing in Children's Books in Print: Subject Guide under the headings AUTOMATIC DATA PROCESSING, AUTOMATION, AUTOMATION-FICTION, COMPUTERS, COMPUTERS-FICTION, and PROGRAMMING (ELECTRONIC COMPUTERS). Then I added to my list any listing under these headings from the three children's collections in this area. Finally, I began looking at the twelve titles which I was able to borrow from these collections and several of those for upper elementary and junior high age included bibliographies of materials which I had not already discovered.

In reviewing these materials my purpose was twofold. I attempted to look at the quality of the book for it's intended audience and, also, to see if it might be used with poorer readers among the adult population.. Therefore I was looking for the presence or absence of technical jargon which is often used in the more sophisticated materials in any field, and for clear simple explanations with good accompanying illustrations. Arbuthnot and Sutherland include as criteria for judging informational books accuracy, organization and scope, currency, author's responsibility, author's competence, format and style (p. 586-90). Huck includes the same information in five greatly expanded categories, including twenty-three subcategories; accuracy and authenticity, content and perspective, style, organization, illustration and format (p. 524-43).

I combined the categories of accuracy, currency and author's competence feeling that all three are necessary components of one category as Huck has done. However I like the combination of organization with scope in the Arbuthnot and Sutherland model. The discussion of the books will be taken up by the following categories: (1) accuracy, author's competence, and currency; (2) organization and scope; (3) format; (4) style; (5) author's responsibility. Only those books which stood out with respect to the category will be mentioned.

Accuracy is obviously the result of the author's competence in handling his subject. The titles whose combination of educator, computer specialist and writer seemed to be better in terms of currency and factual information; They were the DeRossi and Srivastava. Both were sound in their presentation in that they could be used for an audience several years older than the intended one without difficulty. Three of the titles were written by science educators and those by Berger were excellent; but the Kenyon, though accurate, is more about calculators than computers. Finally, the writers in the computer field tended to produce texts which were not inaccurate but more difficult to understand. The exception to this was the Meadow title which was very well organized and simply presented. One author's credentials were not given, Steinberg. His book lacked the more appealing formats in vogue in the 'seventies' but the material included seemed to be accurage and current for 1969.

Those materials which I found most appealing visually were published in the current decade with the exception of the pamphlet by Corliss, which included a great deal of information and excellent graphs and charts in a very clear presentation. Both the DeRossi and the Srivastava should be current for many years beoause they are directed toward ideas applicable to systems rather than to a specific machine (i.e., flow charts, input, bits rather than the latest IBM 360 or IMSAI 8080). The illustrations included are almost self explanatory, and not too many photographs of equipment which will become obsolete are included.

A second factor in currency is illustrated by Halacy. In the Halacy much factual data is included which is clearly labeled with the date the data was collected. Then the reader, teacher, or student can consider any point made in the book in the proper context as the material becomes dated. Two books treated future developments.

The Rusch presents the use of computers for weather control, computers in business, education, transportation, crime prevention, medical diagnosis and personal shopping. However, I preferred the presentation in Berger's Those Amazing Computers which presented many of the same uses.

The only inaccuracy in the facts which I found was in the Snyder title which defined bits and gave the pronounciation as that of bytes. Most of the books were both accurate and clear in the material which they presented.

More major differences begin to appear when organization and scope are considered. Obviously a thirty-two page book cannot cover the material included in one two-hundred-and-seventy-nine pages long. Of the books intended for the primary aged child the Srivastava covers factual information in a manner more basic than the other books and makes it relevant to a child. The illustrations show the material that is being presented at each point in the text, but there are no formal organizational features such as a table of contents or an index. For older children the DeRossi presents much of the same material, going more deeply into the binary system and details of punched cards, but making ideas available through both index and table of contents. None of the other titles included presented the topics any better than these two. However, Berger in his title for older children treats the subject of computers by examples found in various fields of endeavor and uses the examples as a basis for his technical explanation of factual material and as a stepping stone to future developments in the field. He does a much better job of making the future seem relevant than Rusch, but he fails to present the retail business possibilities which Rusch covers in some detail.

The consideration of format ties in closely with the concept of the organization and scope of any work. The primary books present a simple conceptual framework brightly illustrated in the case of Srivastava, done in three colors in the case of the simple Berger title and in photos in the other title. Actually the Srivastava is only in three colors, but two of them are pink and orange, which makes the appearance much more alive than the rust, turquoise and grey combination of the Berger. The bindings of the three titles seemed comparable to each other and the quality of stock used similar. The print in the Srivastava seemed more readable, probably because the contrast between the print and the color of the paper is better visually.

Three of the books were more dated in their appearance, those of Steinberg, Corliss and Halacy. I was surprised to find that Kenyon, the oldest title of all, did not have this problem. I suppose that is due to the "do it yourself" format which required clear directions and diagrams. As I mentioned earlier, the Corliss did have good diagrams, but the print was smaller and general organization set in an older format, probably because the intended audience was adult and not juvenile.

The four remaining titles for intermediate aged children appeared acceptable to the child looking for material on this particular subject. The Berger uses less illustration and a more adult format; the Steinberg was to me the least appealing and the heavy use of photos will date the material sooner than the other titles; the Meadow includes a lot of illustrations with a fair amount of text, exercising excellent placement taste so as not to overwhelm the reader. The DeRossi covers much of the same material, slowing down to present the

binary system with copious examples and illustrations and explaining things very carefully. I felt that both these last two books could be used by adults successfully because the format is very helpful but not condescending to a younger audience. Both Steinberg and Berger present their materials from a more career oriented approach. The former includes many pictures with women and minorities represented but never shown supervising men. However two photos do show racially mixed situations under the supervision of someone not shown or a white male (p. 57 and 62-3). Meadow uses no minority pictures except two grade school children (photo insert between pages 56-7). Berger includes one black man labeled an "expert" (p. 21) and an oriental child (p. 114-5); women are shown as programers (p. 22), ticket agents (p. 46-7), computer operators (p. 86), nurses (p. 130), lab technicians (p. 138), but not using computers in any of the final chapters which emphasize using computers for fun (i.e., games, simulations and computer clubs).

Finally, the two titles by Ray and Steinberg include in their photographic presentation a very sexist view of computer careers which may indeed, reflect with accuracy the field as it was in the late sixties. However, I found it objectionable that neither women nor minorities were included in either the administrative or the research types of jobs where educated men would be working under them.

Above accuracy, style has more effect on the cumulative readability of a set of materials. An aspect of style determines how the field is represented by the book in question. The Halacy title (Computers; the Machines We Think With) has extensive literary allusions which would not be familiar to the average reader and would break up the sense of continuity and imply that such literary interests would be connected to the computer field. The flow of the text, its freedom from complicated constructions, determines how the reader feels about his understanding of the material to some degree and whether he will continue to read to the end. Freedom from complicated constructions does not mean that the material is not presenting facts, but that each motifeme (Alan Dundes' word for the single idea in a piece of folk literature) is explained before extraneous ideas are inserted in the text.

Halacy wrote the most obviously difficult material which I read.

> "The answer lies in putting Boolean algebra on the job, with a system of gates and inverters capable of juggling the multiplicity of combinations." (p. 119)

I would judge the Kenyon title second most difficult because of technical jargon, though there are children who love these diagrams with their potentiometers, etc. Amazingly, the Corliss, DeRossi, Meadow and Srivastava all are very clear in their presentation of the material at the various levels which they are written to reach. I feel that the Berger was not intended to present the technical information which those six titles present and that it does succeed in presenting much relevant information in light of its societal uses. It is well written and the use of illustration tied with concrete textual example is an improvement over many of the titles using photos which never bother to make use of them in the text, not even a caption.

The final category for consideration is that of the author's responsibility to present his biases toward his subject and the potential dangers of the material to the reader. This is the area where the fiction writers come into their own, presenting far more fact than their non-fiction peers. Only Berger mentioned the problem of computer misuse. Although the credentials of some of the authors and the sources of their illustrative material tended to indicate to me some of the bias which would be found in their writing, most children would not have the necessary background to pick up these details. Of course, the fiction writer has an advantage in that he is writing fiction and the richness of the reader's experience stems in part from the writer's vivid presentation of material from a biased viewpoint.

Several present mechanization as evil. For example Andre Norton presents the use of powerful computers as leading to man's abandoning responsibility for his own survival in the book Outside and the development of extrasensory powers which tap a central computer's power source save the children. Paul Fairman in The Forgetful Robot makes the point that all mechanical devices are only as good as the programming and circuitry. John Christopher presents a source of control which is used to dominate the human race by a mechanical control of a cap surgically implanted on the brain at the age of fourteen. In Alexander Key's book The Incredible Tide a computer is misused by the authoritarian survivors of a holicast and reprogrammed to predict an impending disaster by a scientist in hiding in their midst. Another factor to be mentioned is that only in these fiction books does one get a realistic picture of the math and science background which one must have to advance beyond the entry levels in the various technological fields.

In conclusion, I would recommend the purchase of Berger and Srivastava at the primary level. I would recommend DeRossi, Meadow, Berger and Corliss for use with intermediate and junior high students, and I would see that the fiction titles dealing with computers in future society and present situations were listed in bibliographies with the nonfiction. I would use both nonfiction and fiction with older audiences, but the DeRossi, Meadow and Srivastava contain the factual material presented in the simpliest clarity.

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